NASA - LaRC

MODIFICATIONS TO THE NATIONAL TRANSONIC FACILITY FOR INDEPENDENT OPERATION (BUILDING 1236)

FY '92 MAJOR CoF PROGRAM

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AUGUST 23, 1989

NATIONAL TRANSONIC FACILITY

- RESEARCH PROGRAMS - FULL SCALE REYNOLDS NUMBER TESTING (HIGH ASPECT RATIO WINGS, DRAG REDUCTION. ETC.)
  - TRANSPORTS, FIGHTERS, AND BASIC FLUID MECHANICS RESEARCH
  - 2.5 TO 3 YEARS BACKLOG
  - UTILIZED BY DOD, NASA, AND INDUSTRY
  - FACILITY TO REMAIN IN HIGH DEMAND
- OPERATING FREQUENCY
  - TWO SHIFTS/DAY - 7:00 AM TO 11:45 PM
  - RUN TIME NOT INCLUDING COOL DOWN AND WARM UP APPROXIMATELY 2 HOURS/SHIFT
- POWER REQUIREMENTS
  - TYPICAL POWER - 67,000 HP
  - MAX POWER - 120,000 HP

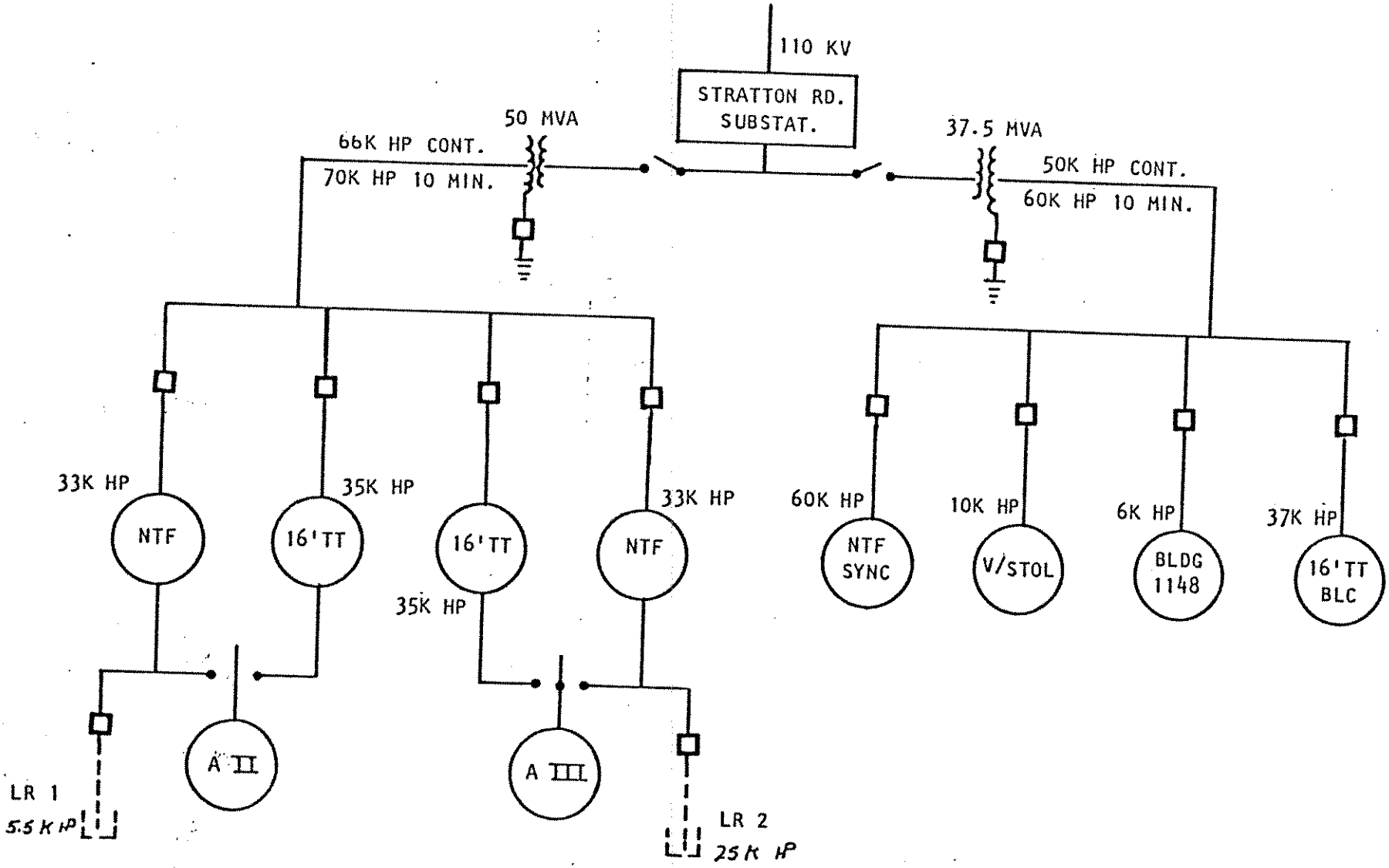
16-FOOT TRANSONIC TUNNEL

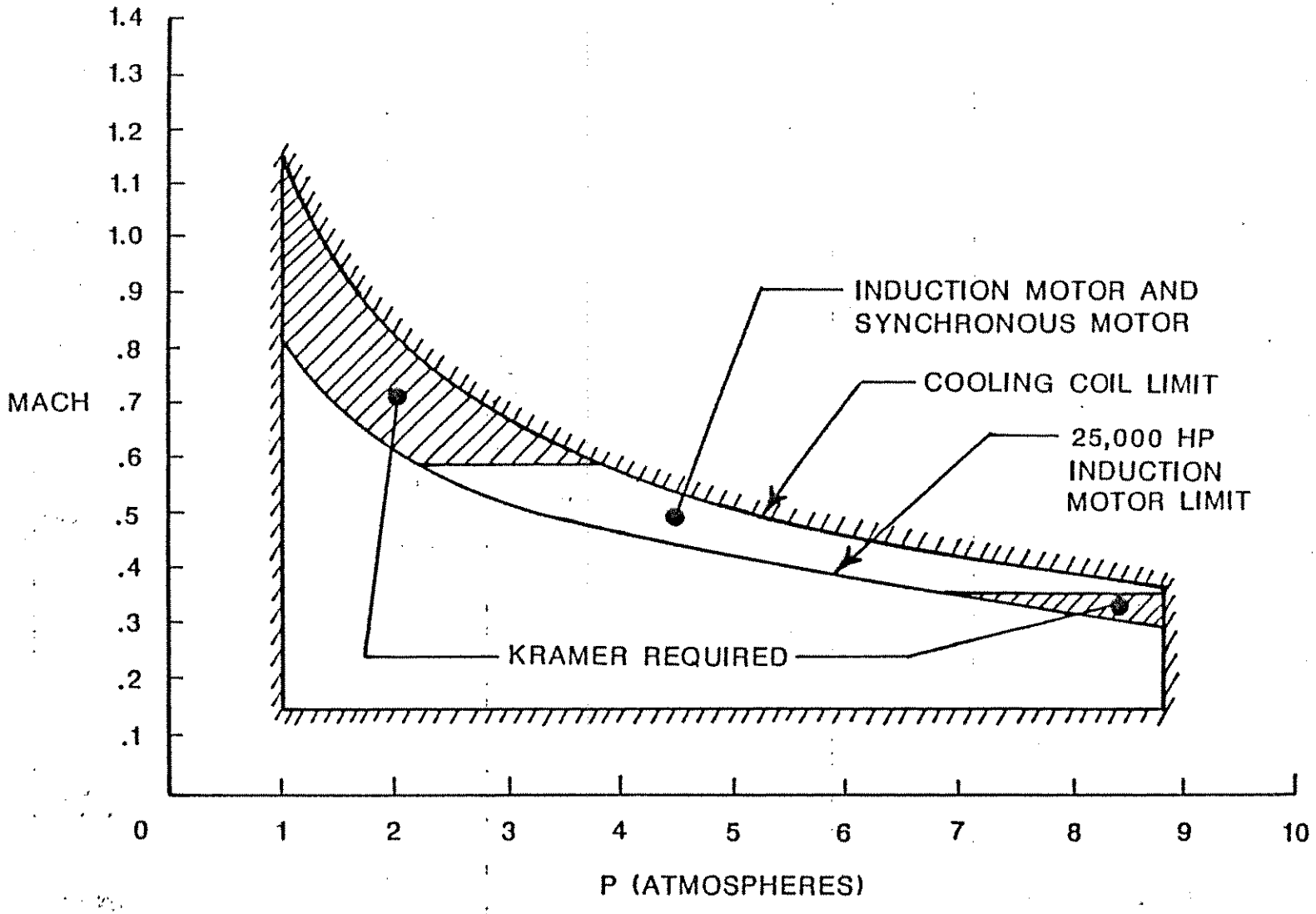
- RESEARCH PROGRAMS - PROPULSION INTEGRATION
  - CURRENT - TRANSPORT, FIGHTER, NASP, & NOZZLE DEVELOPMENT
  - FUTURE - TRANSPORT, FIGHTER, NOZZLE DEVELOPMENT, HIGH SPEED CIVIL TRANSPORT
- OPERATING FREQUENCY
  - TWO SHIFTS/DAY - 11:00 PM TO 4:30 PM
  - RUN TIME - APPROXIMATELY 2 HOURS/SHIFT
- POWER REQUIREMENTS
  - 65,000 HP SUBSONIC TESTING
  - 107,000 HP SUPERSONIC TESTING

EXISTING PRODUCTIVITY CONFLICTS (16-FT NTF)

- NTF AND 16-FOOT MUST SHARE SAME DRIVE CONTROL EQUIPMENT MUCH OF THE TIME
- INSUFFICIENT POWER TO OPERATE NTF AND 16-FOOT SIMULTANEOUSLY AT HIGH POWER LEVELS
- IMPACT OF SHARED EQUIPMENT:
  - EXTREMELY HIGH USE OF EXISTING DRIVE CONTROL EQUIPMENT
    - -- EXCESSIVE WEAR AND BREAKDOWN
    - -- AS NTF BECOMES MORE PRODUCTIVE, DELAYS FOR BOTH FACILITIES EXPECTED TO INCREASE
  - INEFFICIENT USE OF TESTING TIME FOR TWO MAJOR FACILITIES
  - BOTH FACILITIES FREQUENTLY SUPPORT PROGRAMS OF NATIONAL INTEREST, AND TIMELINESS IS USUALLY IMPORTANT

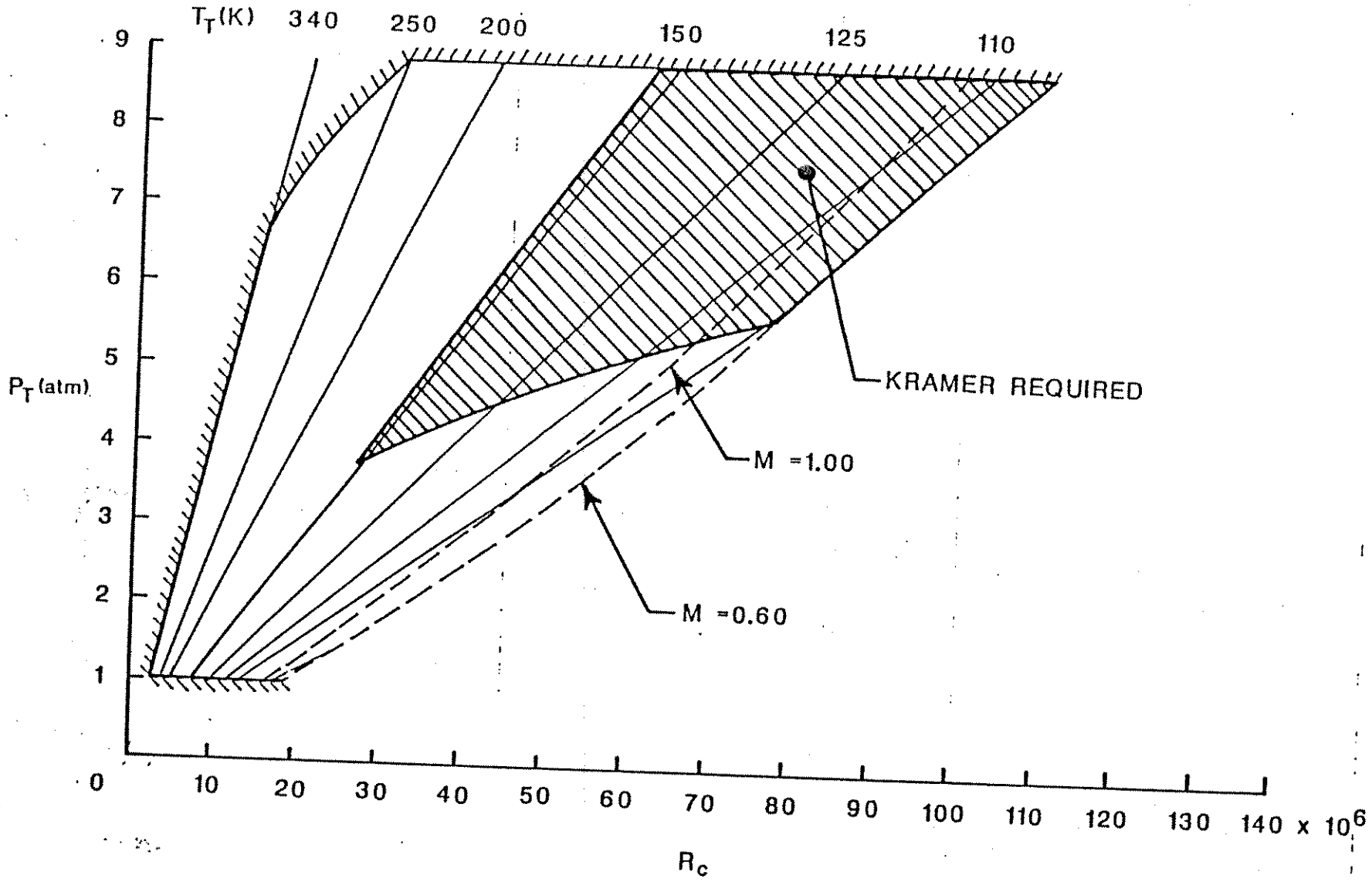
NTF POWER SUPPLY



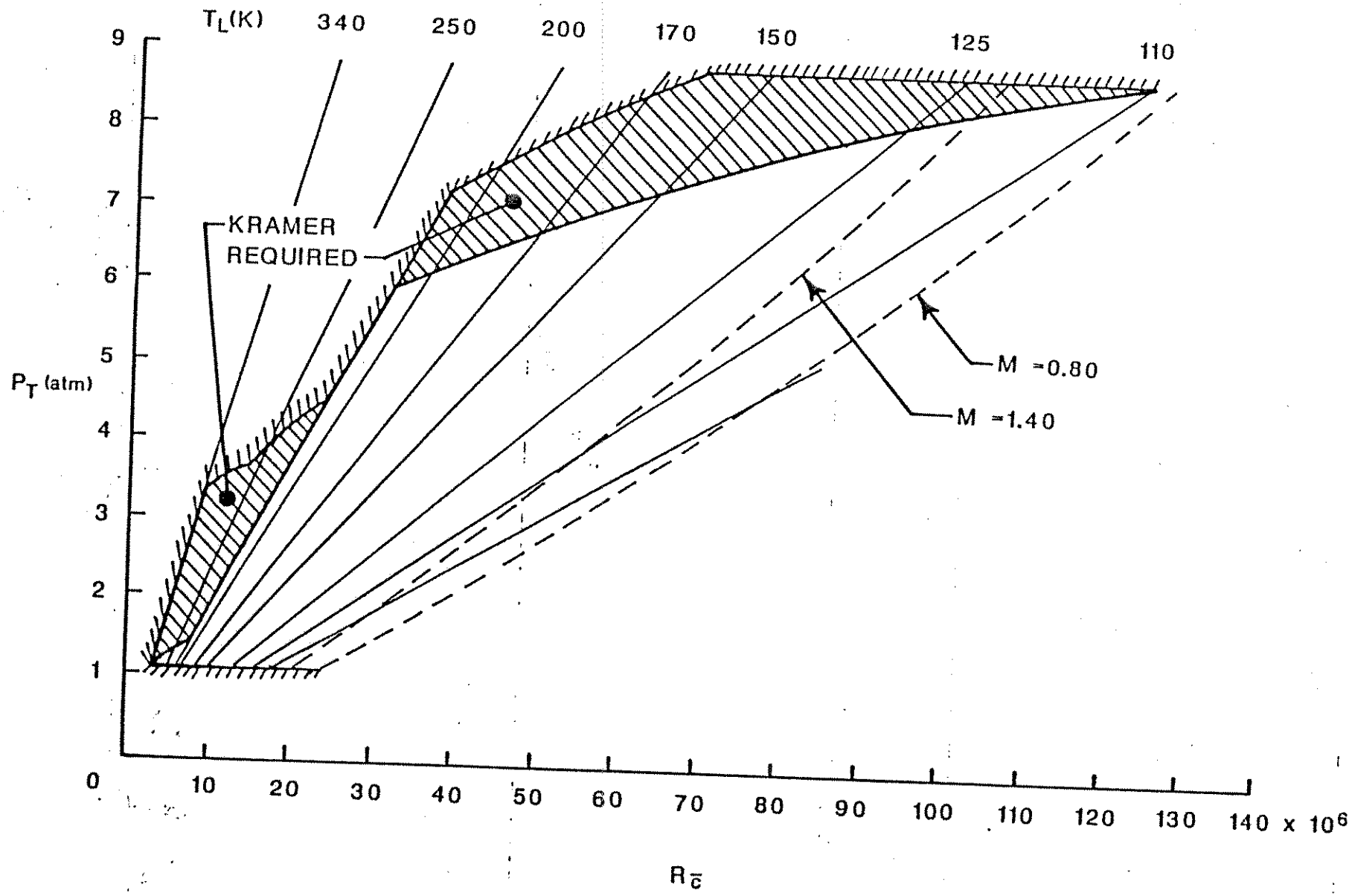


NTF OPERATING ENVELOPE USING COOLING COIL

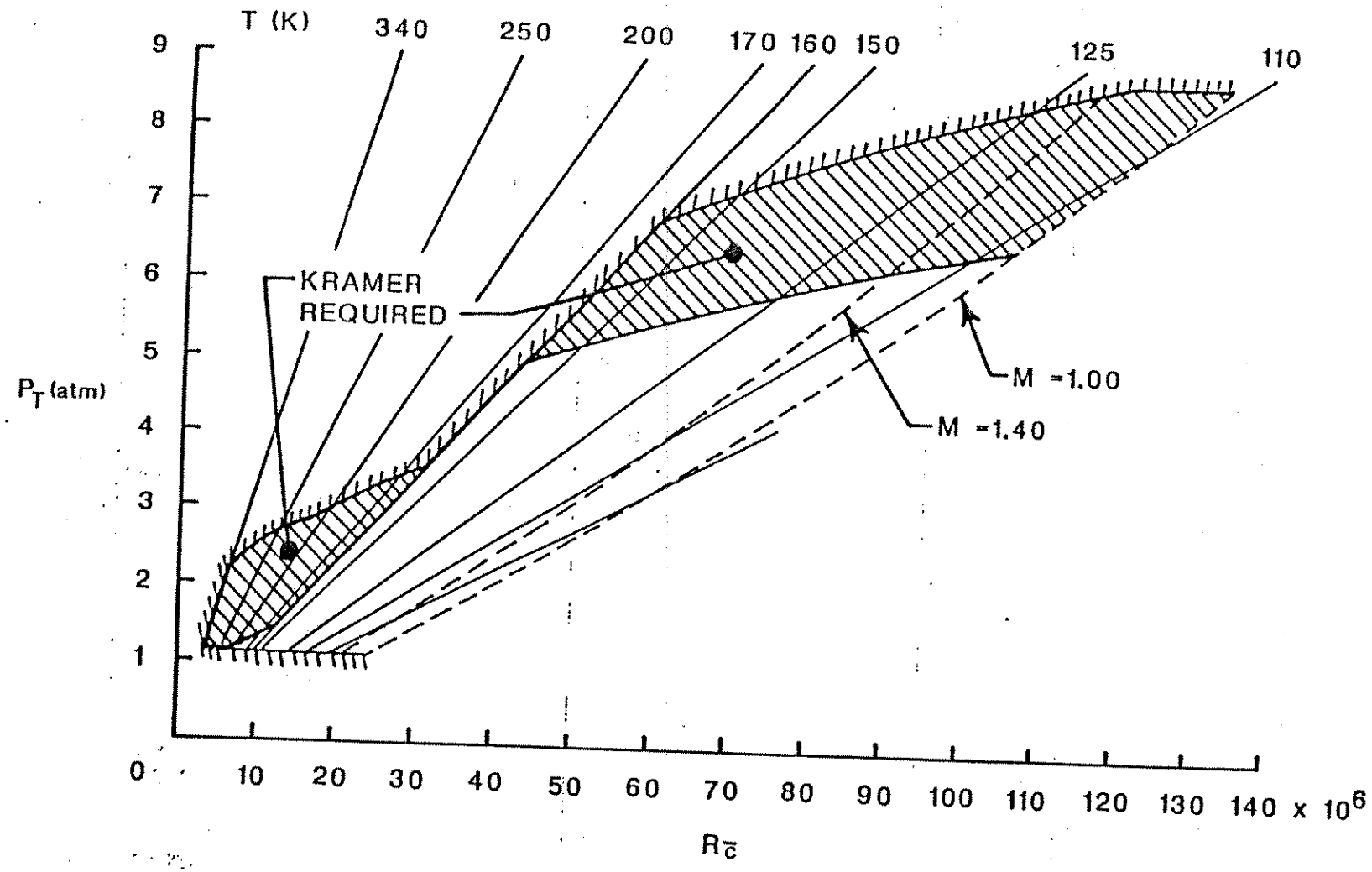
(LIQUID RHEOSTAT AND SYNCHRONOUS MOTOR)



NTF PERFORMANCE MAP FOR FREE-STREAM MACH NUMBER OF 0.60.
(LIQUID RHEOSTAT AND SYNCHRONOUS MOTOR)



NTF PERFORMANCE MAP FOR FREE-STREAM MACH NUMBER OF 0.80.
(LIQUID RHEOSTAT AND SYNCHRONOUS MOTOR)



NTF PERFORMANCE MAP FOR FREE-STREAM MACH NUMBER OF 1.00.
(LIQUID RHEOSTAT AND SYNCHRONOUS MOTOR)

PROPOSED FY '92 CoF PROJECT

- PROVIDES FOR INDEPENDENT OPERATION
  - NEW 15,000 HP LIQUID RHEOSTAT TO CONTROL ONE NTF DRIVE MOTOR
  - INCREASED ELECTRICAL POWER SUPPLY SYSTEM TO DRIVE CONTROL
- INCREASES USER BENEFITS (NASA, DOD, INDUSTRY)
  - IMPROVES PRODUCTIVITY THROUGH MORE EFFICIENT USE OF FACILITIES
  - GREATER RESPONSIVENESS TO HIGH PRIORITY RESEARCH/ DEVELOPMENT PROJECTS
  - MORE EFFICIENT USE OF MANPOWER

ESTIMATED COST

• NEW TRANSFORMER	$1,162K
• NEW LIQUID RHEOSTAT FOR NTF	$1,076K
• CABLING, SWITCH GEAR, ETC.	$1,904K
• MODS TO EXISTING NTF RHEOSTAT	$ 161K
• NEW COOLING TOWER CELL & PIPING	$ 538K
	$4,841K
INCLUDING ADDERS	$6,900K